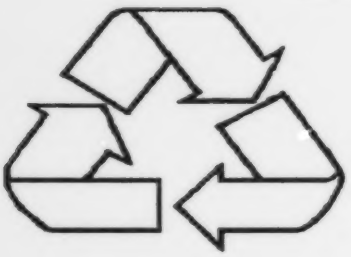
Recycling



Now is the time!

Background Paper

Manitoba
Environment

Recycling
Action Committee

90-00446/

The Recycling Action Committee wants to hear from you

"Humanity has the ability to make development sustainable - to ensure it meets the needs of the present without compromising the ability of future generations to meet their own needs."

From "Our Common Future", the Report of World Commission on Environment and Development

On June 8th 1989, Manitoba's Minister of the Environment, the Honourable Glen Cummings, announced the appointment of a Recycling Action Committee. Its mandate is to develop a comprehensive plan for promoting recycling and waste reduction in Manitoba. Achieving a 50% reduction in waste by the year 2000 is seen by the Government as a key part of its strategy to advance sustainable development. The Recycling Action Committee will issue its Action Plan by the summer of 1990.

The Recycling Action Committee represents a broad cross-section of organizations with a stake in promoting recycling. This includes municipalities, community and church organizations, the business community, environmental and consumer organizations, and industries and organizations directly involved in recycling programs.

To make sure that Manitobans are fully involved in developing the recycling plan, the following are planned:

September 25, 1989: Release Background Paper;
October 1989: Open House / Town Hall meetings in: Winnipeg, Brandon, Thompson, Dauphin, Selkirk and Winkler;
November 1989: "Mini-meetings" in other communities;
October-December 1989: Meetings with interest groups;
February 1990: Preparation of a Draft Action Plan;
March 1990: "Manitoba Recycles!" Conference;
May 1990:Recycling Action Plan submitted to Minister.

Purpose of this paper

The purpose of this paper is to introduce the issues and background behind the challenge being addressed by the Recycling Action Committee. The intent is:

- to stimulate input from the public;
- to identify areas where there is agreement or disagreement;
- to draw attention to aspects that should be investigated further;
- to learn of ideas that should be pursued; and
- to learn generally about how Manitobans view recycling.

The Background Paper has been drafted to stimulate this process and is not intended to reflect the perspective of all members of the Recycling Action Committee or the organizations they represent. We welcome your input.

Recycling, now is the time!

At present most Manitobans, and other Canadians, enjoy a high standard of living relative to the majority of the world's inhabitants. Unfortunately, this standard of living has evolved through a level of consumption which rapidly depletes our stock of virgin materials and generates large quantities of waste. Our present lifestyle is not sustainable into the future.

Recent public opinion surveys have indicated that the vast majority of Canadians think that the state of our environment is one of the major problems confronting us today. Judging from press comment, letters to the editor and radio call-in show participants many Manitobans share this opinion.

Growing numbers of Manitobans are concerned about the type and volume of material they are throwing into the garbage collection system. Environmental groups across the province are receiving phone calls and letters asking:

"It is such a waste to throw all this stuff in the garbage. Why isn't someone doing something about it?

"What can I do with my old newspapers? I feel terrible about the amount of stuff I throw into the garbage."

"Is there some way to recycle the waste office and computer paper in my business? It seems a shame to just bury it in the dump."

"Isn't there something better to do with the empty boxes at the shopping centre than putting them in the trash compacter?"

"Why aren't the glass mineral water bottles returnable for a refund? Doesn't the manufacture of glass create environmental damage?"

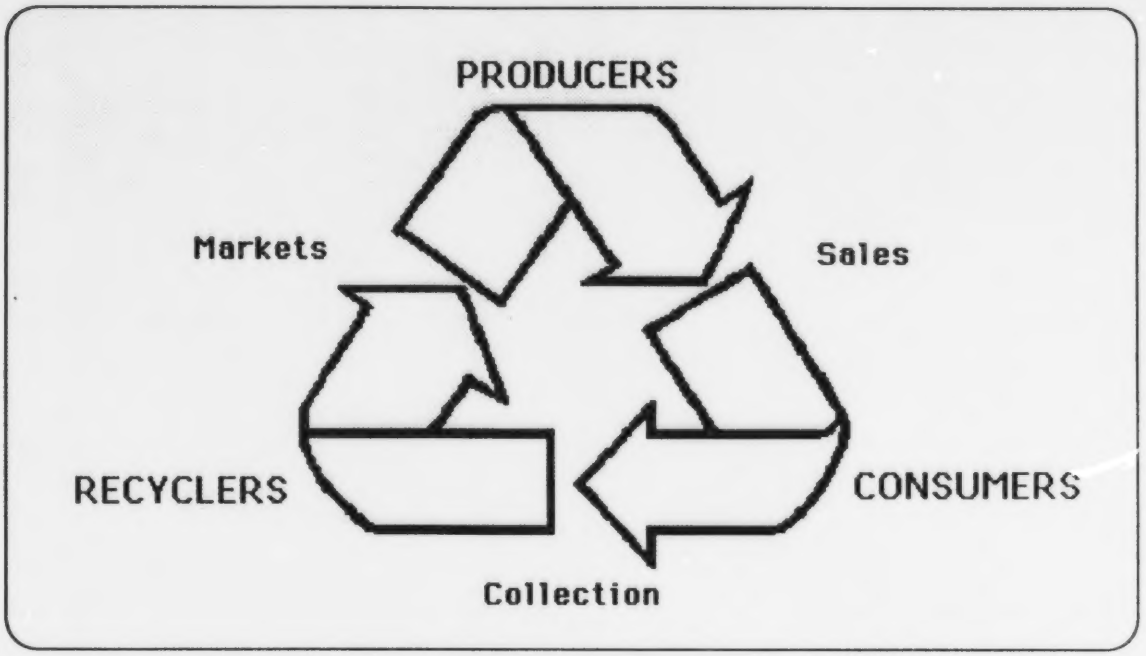
"Aren't tin cans worth anything to anyone? Steel seems to be such a valuable material."

The concern that Manitobans are showing about waste is justified. Federal Environment Minister Lucien Bouchard recently observed that Canadians are among the most wasteful people on Earth! It is estimated that we produce one tonne of garbage each year per capita and that this quantity is increasing rapidly.

These wastes, with their potential for environmental damage, stay with us long after we "dispose" of them in the garbage dumps and landfills. We may remove them from our houses and businesses but we do not remove them from "our living room". Furthermore the materials contained in the wastes generally have to be replaced from the limited and shrinking stocks available to our own and future generations. The extraction of these new or virgin materials also carries environmental risks.

All in all, a decidedly unsustainable lifestyle.

"Recycling" helps us reach a sustainable lifestyle. It slows the process of useful things becoming waste. It salvages old materials from households and businesses before their value is destroyed by turning them into waste. For example, yesterday's newspaper contains old news which may not be useful. The residual paper, however, if treated carefully and recycled before it becomes waste, is useful and valuable.



What is recycling anyway?

The recycling loop is an "endless" mobius loop divided into sections to represent the three stages of recycling. If the loop were broken at any stage, the flow of material through the loop would stop and waste would result. The cycling of material through the loop mimics the natural processes of growth, decay and regrowth as illustrated by the decay of the old trees in the forest to make the minerals and nutrients needed by the young trees growing in their place.

At the top of the logo are the PRODUCERS that sell items to both household and commercial CONSUMERS. CONSUMERS have an important choice to make concerning the residues of consumption. They could be disposed of as waste or could be separated for recycling. When recycled, materials are taken to RECYCLERS through a collection process. RECYCLERS sort and process the residues and then market them as secondary materials to PRODUCERS. The secondary materials are used as substitutes for virgin materials.

The volume of materials going through this loop is limited by the weakest link in the chain, which in North America has usually been the market. If there is no market for the materials collected, there is no recycling. If collection continues without a market materials must either be stored until a market develops or be deposited into a landfill. The first maintains the potential for recycling, the second does not. Both methods create additional costs.

Recycling is the starting point for thinking about WASTE MINIMIZATION. Recycling has been a part of life through the years. Many Seniors recall the "rag and bone" buyers of Winnipeg in the early decades of this century and the patriotic salvage drives of the World War II.

The whole subject of waste minimization is frequently summarized as the "4-R's Reduce, Re-use, Recycle, and Recover.

REDUCE: use non-disposable durable products, maintain equipment and goods, switch to thinner lighter materials where possible.

RE-USE: largely in terms of reusable containers with a return deposit, but also in terms of non-disposable semi-durables such as diapers, sheets, towels, and dishwares.

RECYCLE: reclaim potential waste material before it is discarded and use it to make the same or another product.

RECOVER: means to recover energy in the form of heat from waste materials, either in an energy recovery incinerator or as refuse derived fuels. In recovery, wastes are reduced to ash, heat and combustion gases.

A fifth "R", Residue Management, refers to disposing of waste materials in an environmentally safe manner. However, the disposal of wastes is beyond the Recycling Action Committee's mandate.

What is recyclable?

At present, less than 2 percent of all of Canada's solid waste is recycled. That compares with recycling rates of 11 percent in the United States and 50% in Japan. Experts estimate that recycling's potential is about 50% of the waste stream, with waste reduction and reuse permitting additional impact on the waste steam.

Recyclables

Materials:

°Paper (Newsprint, corrugated boxes, office papers, mixed papers)
°Plastics (Soft drink, food and other containers)
°Glass (Bottles and jars)
°Aluminum (Cans and other aluminum products)
°Metals (Appliances and other steel products)
°Wood (Pallets, lumber etc.)

Compost:

°Leaves, grass and brush
°Food wastes
°Some other organic materials, such as paper contaminated with food

Nonrecyclables:

°Wastes contaminated by food residues, household chemicals or dirt
°Composite materials, e.g., aseptic boxes made of paper, foil, and adhesives,plastic coated paper, furniture and appliances (other than for their metal content)
°Miscellaneous inorganics, such as street sweepings

Why recycle?

The positive impact of recycling on the environment is large.

It diverts materials from the waste stream, replacing virgin resources as feedstocks for industry.

It saves energy since the secondary materials are already in a more processed form than virgin materials.

It reduces emissions of "greenhouse" gases, such as carbon dioxide, by decreasing the amount of fossil fuel used in producing materials.

It reduces landfill emissions of methane and carbon dioxide by reducing the organic content of waste.

It helps to maintain the release of oxygen into our atmosphere by reducing the depletion of our forests.

Recycling must be done in a way that recognizes and prevents its potentially negative environmental impacts. Some recycling processes may require harsh chemicals, or may create dust and generate solid waste.

Recycling creates jobs in the processing and manufacturing industries.

It creates valuable resources where none existed before, e.g. the Manitoba Rolling Mills use "urban ore" in the form of scrap iron and steel as the basis of its production.

It creates additional "raw material" exports for Manitoba in the form of waste paper, used oil, glass cullet, etc.

It is a feedstock for manufactured exports such as building papers and boards, cellulose insulation and plastic and metal products.

It provides employment for handicapped workers in rural areas.

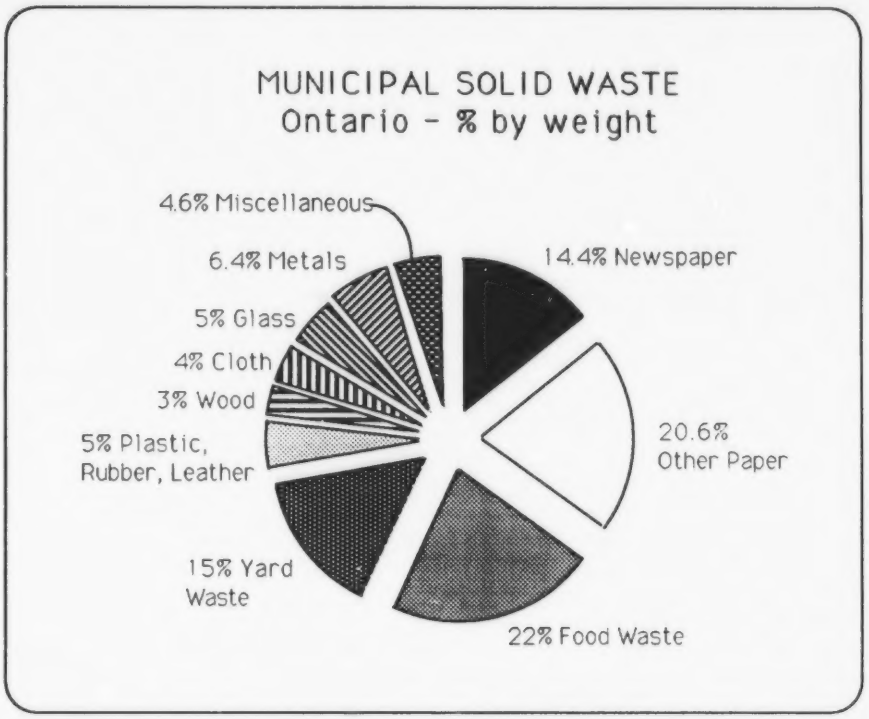
Recycling creates value from what would otherwise be a burden on society, because the majority of the costs of waste disposal are borne by the public.

Do we have a waste problem in Manitoba?

Recycling and waste minimization are responses to a problem of too much waste. But is this really a problem in Manitoba where we have so much land compared to our population; where we seem to have such an abundance of natural resources? Can we not just go on doing what we've done in the past?

Two main questions have to be addressed :

1. Are we wasting our resources?; and
2. Can't we just keep on landfilling our waste?



Are we wasting our resources?

Our wastes contain many resources with value. The chart titled "Municipal Solid Wastes" provides some information on what is in our waste stream. It is believed that each tonne of solid waste has recyclable materials in it worth between $5 and $22. Since we presently collect and dispose of about 1 Million tonnes of waste, we are throwing away between $5 Million and $22 Million, depending upon market prices, each year. To make matters worse, in 1987 we spent almost $20 Million doing it.

Waste streams vary greatly, depending upon where they originate. For example, household wastes, which are about 50% of the total amount of municipal solid wastes, are quite different in composition from wastes from business and industry. Office wastes tend to be high in paper. Wastes from stores tend to have a lot of corrugated cardboard. Wastes from manufacturing will not have as much paper in them.

Some industrial waste streams are already being recycled. Manitoba's scrap metal industry relies mainly upon waste metal from local companies. Frequently waste plastics from manufacturers are recycled into other products, sometimes without even leaving the plant.

Overall, the amount of waste each of us generates has been increasing each year. Between 1980 and 1987 the amount of waste generated in Winnipeg increased by 50%, a growth rate far in excess of the population growth. Should this rate of growth continue, we will always be needing bigger and better waste disposal systems and will continue to throw away these resources.

Can't we just keep on landfilling our wastes?

The land we use for landfills today, we leave behind tomorrow as severely contaminated environments. Currently, we can place as much as 40,000 tonnes of waste into each hectare of landfill space. If all of Manitoba's landfills achieved this density, we would have used about 25 hectares of land for waste disposal in 1987. Between 1990 and the year 2000, we will require at least 445 hectares (1,100 acres) for waste disposal. That is enough land to fit three Assiniboine Parks into.

What we dispose of has been changing rapidly. It is believed that about 1% of the the solid waste stream is hazardous wastes from homes. Routinely, used oil, old paint, solvents, heavy metals and other toxic materials from households are inappropriately disposed of with the domestic garbage. While disposal of hazardous wastes from industry is regulated under the Dangerous Goods Handling and Transportation Act, amounts from households are excluded.

Buried wastes degrade at different rates or sometimes not at all. Those which do break down release gases and liquids as they decay. Gases from disposal sites, and liquids leaking from improperly designed ones, have been known to cause environmental problems hundreds of meters away from the site.

The different rates of decay have been known to break holes in the cover layer and increase the potential entry of rain water to buried wastes. Water moving through the buried wastes can pick up contaminants and carry them down to the groundwater.

These lands are severely contaminated environments and will require continuing monitoring and maintenance for decades. This is an environmental legacy which we leave our future generations.

While proper design and operation can contain the worst problems associated with waste disposal sites, a strong public reaction is aroused whenever a new site must be found. Because wastes are generated where people live, disposal must be arranged for, usually in someone else's back yard.

Many of Manitoba's municipalities face this challenge in the coming decade. One of the exceptions to this is the City of Winnipeg, who are finalizing the purchase of a new site on the south side of the city. Winnipegers will have adequate capacity for some decades, however they face the prospect of long transportation distances from collection to disposal.

Recycling saves energy and materials

One Tonne of	Saves	and Saves
Metal	2,860 Kwh	1.5 tonnes of Ore
Glass	946 Kwh	1.2 tonnes of Raw Material
Paper	3,300 Kwh	3 tonnes of Wood Fibre
Aluminum	74,800 Kwh	4 tonnes of Bauxite
P.E.T.*	27,720 Kwh	6 cubic metres landfill space

* P.E.T. (polyethylene teraphalate) is one of many different plastics used to package goods. It is most commonly used for carbonated beverage and liquor containers.

Is recycling economic?

At the present time, as we grope towards economic and social development that is sustainable, the private benefits of recycling are frequently less than the private costs. However, it is incorrect to label recycling uneconomic on this basis alone.

In economic terms, the benefits of recycling are of two types: private (to the individual) and public (to all of society).

PRIVATE BENEFITS: are easily measured within the market system as money:

- from the sale of reclaimed materials,
- from reductions of input costs to the users of secondary materials, and;
- reductions in the cost of waste collection and landfilling, among others.

PUBLIC BENEFITS: are not easily measured within the market system because they are improvements in environmental quality from:

- reduction of unsustainable components of our present lifestyle,
- reduced environmental degradation from raw material extraction, and,
- fewer waste products accumulating in the environment, among others.

In determining whether recycling is "economic", we must include consideration of the social costs of waste disposal and environmental degradation and make sure that the playing field is not tilted towards "throw away" solutions.

How do we make recycling work?

The recycling logo points to MARKETS, SALES, and COLLECTION as the linkages between RECYCLERS, PRODUCERS and CONSUMERS. These same links also point to the basics of recycling: QUALITY, DESIGN and COLLECTION.

The QUALITY of the secondary materials offered for sale by RECYCLERS to PRODUCERS is the key to closing the recycling loop. The higher the quality of the secondary material, the more successful it will be in competing with virgin material.

Secondary materials are important world traded commodities with major flows of goods taking place between most trading countries. As an example, waste paper fibre from Canada is exported to the United States, Japan, Korea and many other countries. Total exports of waste paper from Canada were 170,000 tonnes in 1988. At the same time Canada imported 550,000 tonnes of waste paper in 1988.

The waste paper in international trade is used in a number of different products. Newsprint, tissue paper, writing papers, building papers, box board and corrugated boxes are all made from secondary paper fibre in various countries including Canada. The quality of secondary fibre demanded varies with the type of product made. In fact there are more grades of waste paper fibre than there are grades of wheat traded in the international market. The box on this page gives an example of the quality specification for one of the highest grades of secondary newsprint fibre.

The Special News De-ink Quality is very high quality residual newsprint paper which competes with virgin pulp chips as a feedstock to a newsprint pulp and paper mill. The requirements for the residual materials are set by the quality of the final product. If the old newspapers have been sunscalded or exposed to moisture, the characteristics of the fibres will be changed and no longer compare favourably with the virgin pulp fibre. Such newspapers might then be recycled to a product with lower quality requirements such as building board or roofing paper etc.

An important factor for recycling is the DESIGN of the original product. Many products are designed without recycling in mind and depend upon the ability to be "thrown away". The "Garbage Crisis" in the rest of North America is forcing many manufacturers to examine their products for ways to increase recyclability. Some of the general trends are towards single component packages or easily separated materials. The plastics industry is introducing a coding system to identify the different resin types used in packages, which will help increase our ability to recycle these materials.

One example is the PET plastic beverage bottle. Originally these contained non-plastic parts: the cap, neck ring, and the label which required extra handling. Many manufacturers have now redesigned their bottles in order to make recycling easier.

The environmental and disposal impact of products and packaging are increasingly becoming important features in marketing, as is evidenced by environmentally friendly product lines or labels. Regulations being pro-

Old news can be good news

Special News De-Ink Quality: consists of baled, sorted, fresh,dry newspapers, not sunburned, free from magazines and papers other than news, containing not more than the normal percentage of rotogravure and coloured sections.

Prohibitive materials (i.e. plastics)...None
Total outthrows...may not exceed 0.25 %

posed in those areas which are facing the "garbage crisis" may introduce new standards for the materials used by our manufacturers.

COLLECTION is for many people the starting point of recycling. Certainly, the most common question being asked is "Where can I recycle this?" The method used to collect materials can affect the quality of the recovered material. Major differences in collection system occur between source separation approaches and central plant processing.

SOURCE SEPARATION of recyclables occurs when materials are kept separate from the garbage stream right from the start. This provides fairly uniform streams of material. Two variations are door-to-door collection or drop-off centre systems.

With door-to-door collection residents and businesses separate the recyclable materials from the rest of their wastes and place them in different containers for pick-up. The recyclables are collected by municipal crews or private contractors, sometimes using specialized vehicles. The collection operator will sort the materials into their categories. The materials collected are sold and the money raised goes to offset the cost of collection. Occasionally, problems with scavengers removing the highest valued materials, such as the aluminum beverage cans, has led to by-laws prohibiting such activities.

With drop-off centres, one or more locations are established where the recyclable materials can be left by the resident or business operator. Separate containers for each material to be collected are stationed at each location. The drop-off centre operator may or may not pay for the materials received depending on the nature of the operation. In a buy-back drop-off centre, materials may be purchased for their intrinsic value.

With CENTRAL PLANT PROCESSING, recyclable materials are mixed at source and taken to a processing centre where they are separated and prepared for market. Many methods are used to sort the materials including, shredding, air separation, magnetic sorting, screens, and hand sorting. The reclaimed materials may require upgrading if they are to be sold into a secondary material market.

Each collection system has advantages and disadvantages. The source separation systems provide the highest quality materials but requires more commitment from the participants. They can provide useful environmental education and awareness. The door-to-door collection systems are expensive to operate but can achieve high levels of participation. Bulk separation systems frequently yield poor quality material and require a processing plant which might be expensive to build and operate.

The 'Blue Box' - A recycling success story

The "Blue Box" is a plastic box designed to help homeowners keep recyclables out of the garbage stream. Newspapers, bottles, cans, beverage containers (and other things in some communities) are put into the Blue Box until collection day. It serves the same purpose for recyclables that the garbage can does for garbage. (Residents are asked to clean the materials before putting them in the box, so that odors and flies are not a problem.) On collection day, the Blue Box is placed at the curb or back lane for pick-up. The enormous success of the Blue Box as a collection device comes from its visibility. Residents participating in recycling can demonstrate that they are doing their bit for the environment.

Because of its success as a collection device, the Blue Box has increased the supply of secondary materials more rapidly than the demand for these materials increased. As a result, their price has fallen to a point at which revenue from sales will not cover the cost of collection, processing the shipping to market. In this case municipalities or other governments must decide if they will pay the additional cost to keep the material from becoming waste deposited in the landfill.

In time, as more producers construct factories capable of using the secondary material, the market demand should increase and the weak link in the recycling loop will be strengthened. The glut of old newspaper in world markets is an example of this problem. Paper makers are looking for assurance that the collection success of the Blue Box will continue before they construct the necessary de-inking plants.

Can we learn from others?

Recycling is being actively pursued across North America and around the world, in both small and large communities. There is a wealth of experience to learn from.

Collection programs

Curbside collection programs are now operating in six provinces, including a pilot program in Winnipeg. The high participation rates in these programs have shown that "public apathy" is not the problem. A lack of recycling opportunities is more imposing.

Legislation

The methods used to support recycling opportunities in other places vary widely. Some places are fortunate to have easy access to the global markets for secondary materials and have not required any development plan. Many jurisdictions don't and are contemplating legislative initiatives. In 1988, more than 2,000 different waste and recycling bills were introduced in the United States.

Some U.S. states have applied taxes on garbage going into landfills and used the money raised to develop recycling programs. In some cases "problem materials" have been banned from the waste collection system or accepted only with a surcharge or tax applied to them. Automobile tires have been a frequent target of such policies.

Another technique has been to ban the sale of materials for which a successful recycling system has not been established. Fast food containers have been a particular target of bans largely because of their contribution to the landfill and of the potential to create litter.

Canadians have frequently established deposits on materials and containers to encourage customers to return the item to an identified refund location. A new variation of this technique is to impose a levy or tax on the item at the time of its sale to a CONSUMER. The funds raised are earmarked to cover the costs of recycling the item or to pay for the additional cost of landfilling the item.

Anticipating such initiatives, several industries have established recycling systems to encourage recycling of their particular goods. The soft drink industry has been a leader in establishing buy-back centres in many locations, including Manitoba, and has participated in the funding of the curb-side Blue Box collection system in Ontario.

Market development

The Manitoba government has established a committee to examine the government purchasing and the opportunities to assist in the development of markets for recycled materials.

How can we all become recyclers?

Who's responsible?

We all are. Everyone has a role in making recycling work:

Industry has a responsibility to consider source reduction, reuse and recyclability in designing products and packaging, and to use recycled materials in their manufacturing.

Citizens have a responsibility to learn about the products and packaging they buy and the waste they create. What is in the product? What is recyclable? What is potentially harmful? How long will the product last? How much does it cost to dispose of it?

Every individual and corporate citizen should assume responsibility for waste disposal and adopt a "pay-as-you-throw" attitude — a recognition of the true costs of disposing of the wastes we generate.

Governments do not have an exclusive responsibility for the environment, but as trustees for the environment they are accountable for holding the rest of society responsible for their treatment of the environment. As well, all levels of government should set a good example by purchasing recycled or recyclable products and products that have been subject to source reduction whenever possible, and handling their own wastes in a way that facilitates recycling and reuse.

Municipal governments maintain specific responsibility for managing waste collection and disposal systems subject to provincial regulation.

The provincial government has a responsibility for maintaining rules and regulations for maintaining an "even playing field" that will encourage recycling and waste minimization and ensuring that standards for residue management are set and observed. It also has a particular role to play in public education and coordination of recycling programs; establishing goals and leadership; providing technical assistance, and issuing regulations.

The Federal government has a specific role in establishing a framework for national coordination and information exchange as well as encouraging the manufacturing industry to design products and packaging for effective waste management.

Let's recycle today

There are many recycling opportunities today that Manitobans are increasingly using:

- the Recycling Council of Manitoba's Recycling Days;

- Manitoba Soft Drink Recycling program for recycling soft drink and liquor containers;

- scrap metal dealers, especially those who welcome household wastes;

- the Manitoba Waste Exchange;

- the Wolseley "Blue Bag" curbside collection pilot project;

- the Provincial Government has established a procurement committee to develop appropriate purchasing policies.

This list is not complete as more initiatives are being added at an increasing pace. A "hot line" for recycling information will soon be established in the Province.

In addition to contacting the organizations listed above, there are many things that can be done immediately. Every Manitoban can contribute by, such as:

Compost organic wastes from your yard and kitchen;

Buy Recycled!

Look for either the recycling logo or the "Planet Friendly Choice" logo when you shop.

Ask store managers if they stock any recycled products.

We must move beyond these actions, which is why a Recycling Action Plan is being developed.

The Recycling Action Plan

Achieving a dramatic 50% reduction in waste generation will require a concentrated and coordinated effort by all Manitobans. Between October 1989 and February 1990 the Recycling Action Committee will be developing a draft Action Plan for public discussion at the Manitoba Recycles! conference in March 1990. A Final Report will be submitted to the Minister of Environment in May 1990.

What will the Recycling Action Plan do?

A successful Recycling Action Plan will change the balance of economic incentive towards the use of recycled and re-usable products and away from the use of virgin and disposable products.

What will be the components of the Recycling Action Plan?

The components of the Plan **might** include:

- fiscal measures, perhaps levies on non-recycled materials or rebates on recycled materials;

- market development initiatives, such as preferential government purchasing and procurement policies;

- industrial strategy elements, for instance to develop a pulp de-inking capacity for the Manitoba paper industry; and

- landfill and disposal requirements to ensure that valuable materials are not destroyed by burying them in landfills.

The components of the Plan are being studied at the present time. The public's comments on the various components mentioned above will be given careful consideration.

How will the success of the Recycling Action Plan be measured?

The success of the Plan can be measured several ways:

- the reduction in the amount of waste deposited in landfills, and other disposal facilities or discharged to the environment on both a total and per person basis;

- the reduction in materials cost, disposal costs and environmental costs that can be achieved by diverting the waste materials to recycling markets;

- the volume of materials actually recycled as new products either in Manitoba or in other markets;

- the level of economic activity that can be generated in the province utilizing the resource materials reclaimed from the waste stream (the waste stream is known as "urban ore" in some places);

- the degree to which individuals and firms can be held responsible for the environmental costs they are presently imposing on society.

The Recycling Action Plan depends on you!

Send us your comments! We want to hear from you. Use the form at the back of this booklet, or write us at the address included at the back.

Get Involved! The Recycling Action Committee is planning open houses throughout the Province between October 10 and 23, 1989. Drop by. Or plan to attend the Spring Recycling Symposium which will review the Draft Recycling Action Plan on March 9 & 10, 1990 in Winnipeg.

1. Would you like to see more recycling?
2. What is the biggest problem to overcome if we are to reduce waste by 50% by the year 2000?
3. What specifically would you like to see done about recycling in Manitoba?
4. Would you like more information about recycling?

___ Please send me information on theManitoba Recycles! Conference in March 1990.

___ Please send me a copy of the Draft Recycling Action Plan in February 1990.

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